Application No. 09/877,923

AMENDMENTS TO THE CLAIMS

A detailed listing of all claims that are, or were, in the present application, irrespective of whether the claim(s) remains under examination in the application are presented below. The claims are presented in ascending order and each includes one status identifier. Those claims not cancelled or withdrawn but amended by the current amendment utilize the following notations for amendment: 1. deleted matter is shown by strikethrough for six or more characters and double brackets for five or less characters; and 2. added matter is shown by underlining.

1. (Currently Amended) A saturable reflector for a laser wavelength λ_L wherein a reflector (2) comprising a first reflector material (4) and a second reflector material (5) is applied onto a surface of a substrate (1), and a layer sequence (3) with a saturable absorbing effect is applied onto the reflector, characterized in that the layer sequence (3) contains a strained-layer single quantum well (6) a cap layer (7), <u>and</u> an optional intermediate layer (9), ~~and an optional anti reflective layer (8).~~ whereby the thickness of the layer sequence (3) is a whole number multiple of $\lambda_L/2$, whereby the material composition of the cap layer (7) and the material composition of the intermediate layer (9) independently comprise the first reflector material (4) or the second reflector material (5), and whereby the material composition of the single quantum well (6), its layer thickness and its strain in the layer structure within a wavelength range all serve to define an absorbing effect, this wavelength range includes the laser wavelength λ_L, and moreover, the degree of the saturable effect is defined by the selection of the distance between the strained single quantum well (6) and the boundary surface of the cap layer adjacent to a surrounding gaseous medium (10).

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2. (Original) The saturable reflector according to claim 1, characterized in that the lattice strain of the single quantum well (6) occurs with the last layer (4') of a reflector adjacent to its one side and/or with the cap layer (7) adjacent to its other side.

3. (Currently Amended) The saturable reflector according to claim 1, characterized in that the layer sequence (3) contains the ~~a~~ low-strain intermediate layer (9) adjacent to the reflector (2) and in that the strained-layer single quantum well (6) is surrounded by this intermediate layer (9) and by the cap layer (7).

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4. (Original) The saturable reflector according to claim 3, characterized in that the material of the intermediate layer (9) is identical to the material of the cap layer (7).

5. (Previously Presented) The saturable reflector according to claim 3, characterized in that the lattice mismatches of the materials (4, 5) of the reflector and of the material of the intermediate layer (9) are smaller than 0.005 nm.

6. (Cancelled)

7. (Previously Presented) The saturable reflector according to any of claims 1 through 5 or 22, characterized in that the reflector (2) consists of individual layers, each of which has thickness that is $\frac{\lambda_L}{4 * n_{GaAs}}$ for the first material (4) with the refractive index n_H with undoped gallium arsenide (GaAs) and that is $\frac{\lambda_L}{4 * n_{AlAs}}$ for the second material (5) with the lower refractive indices n_L with undoped aluminum arsenide (AlAs), moreover, the cap layer (7) and the intermediate layer (9) are made of one of these materials (4 or 5), within which the single quantum well (6) made of indium-gallium arsenide ($In_xGa_{1-x}As$) is strained, whereby the indium

mole fraction (x) and the gallium mole fraction (1-x) in the indium-gallium arsenide compound and its layer thickness all serve to define the absorbing effect as a function within a wavelength range, this wavelength range comprises the laser wavelength λ_L, at which a maximum of the absorption curve lies.

8. (Previously Presented) The saturable reflector according to any of claims 1 through 5 or 22, characterized in that the reflector (2) consists of individual layers, each with a thickness that is $\frac{\lambda_L}{4 * n_{InGaAs}}$ for the first material (4) with the refractive index n_H with indium-gallium arsenide ($In_{0.53}Ga_{0.47}As$) with an indium mole fraction of 53% and that is $\frac{\lambda_L}{4 * n_{InP}}$ for the second material (5) with the lower refractive indices n_L with indium phosphide (InP), moreover, the cap layer (7) and/or the intermediate layer (9) are made of one of these materials (4 or 5), below which and/or on which the single quantum well (6) made of indium-gallium arsenide ($In_xGa_{1-x}As$) is strained with an indium mole fraction x unequal to 0.53%, whereby the indium mole fraction x and its layer thickness define the absorbing effect as a function within a wavelength range.

9. (Previously Presented) The saturable reflector according to any of claims 1 through 5 or 22, characterized in that the reflector is a highly reflecting metal mirror (11) on which the layer sequence (3) is applied.

10. (Original) The saturable reflector according to claim 1, characterized in that the cap layer (7) is a passivation layer or the cap layer (7) is coated with an anti-reflective coating (8), either layer being adjacent to a gaseous medium (10).

11. (Previously Presented) The saturable reflector according to claim 1, characterized in that the strained-layer single quantum well (6) is grown at temperatures below 500° C.

12. (Previously Presented) The saturable reflector according to any of claims 3 through 5 or 22, characterized in that the cap layer (7) with the strained-layer single quantum well (6) and with the intermediate layer has an optical thickness of $\lambda_L/2$ or a whole multiple thereof.

13. (Previously Presented) The saturable reflector according to any of claims 1 through 5 or 22, characterized in that the saturable absorbing effect is adjustable through the selection of the position of the strained-layer single quantum well (6) within the structure of the adjacent layers, whereby these layers each have a greater layer thickness than the single quantum well.

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14. (Previously Presented) A saturable absorber for a laser wavelength λ_L, comprising a layer sequence (3) of several semiconductor layers with a saturable absorbing effect on a substrate (1) that is transparent for the laser wavelength, characterized in that the layer sequence (3) comprises a strained-layer single quantum well (6) and a cap layer (7), whereby the material composition of the single quantum well (6), its layer thickness and its strain in the layer structure all serve to define an absorbing effect within a wavelength range, moreover, a saturable effect is defined by the selection of the position within the standing wave of a laser resonant cavity.

15. (Currently Amended) The saturable absorber according to claim 14, characterized in that the layer sequence (3) contains a low-strain intermediate layer (9) adjacent to the substrate (1) ~~reflector (2)~~ and in that the strained-layer single quantum well (6) is surrounded by this intermediate layer (9) and by the cap layer (7).

16. (Original) The saturable absorber according to claim 15, characterized in that the material of the intermediate layer (9) is identical to the material of the cap layer (7).

17. (Previously Presented) The saturable absorber according to claim 15, characterized in that the lattice mismatches of the material of the substrate (1) and of the material of the intermediate layer (9) are smaller than 0.005 nm.

18. (Original) The saturable absorber according to claim 14, characterized in that the cap layer (7) is a passivation layer or the cap layer (7) is coated with an anti-reflective coating (8), either layer being adjacent to a gaseous medium (10).

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19. (Previously Presented) The saturable absorber according to claim 14, characterized in that the strained-layer single quantum well (6) is grown at temperatures below 500° C.

20. (Previously Presented) The saturable absorber according to claim 15, characterized in that the cap layer (7) is coated with an anti-reflective coating (8), and when combined with the strained-layer single quantum well (6) and with the intermediate layer has an optical thickness of $\lambda_L/2$ or a whole multiple thereof.

21. (Previously Presented) The saturable absorber according to any of claims 14 through 20 or 23, characterized in that the saturable absorbing effect can be set through the selection of the position of the strained-layer single quantum well (6) within the structure of the layers, whereby these layers each have a greater layer thickness than the single quantum well.

22. (Previously Presented) The saturable reflector according to claim 3, characterized in that the lattice mismatches of the materials (4,5) of the reflector and of the material of the intermediate layer (9) are smaller than 0.001 nm.

23. (Previously Presented) The saturable absorber according to claim 15, characterized in that the lattice mismatches of the material of the substrate (1) and of the material of the intermediate layer (9) are smaller than 0.001 nm.

24. (Previously Presented) The saturable reflector of any one of claims 1 through 5, 7-13 and 22 wherein the material composition of cap layer (7) and the material composition of intermediate layer (9) comprise the material of last layer (4') of reflector (2).

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25. (Previously Presented) A saturable reflector for a laser wavelength λ_L wherein a reflector (2) is applied onto a surface of a substrate (1), and a layer sequence (3) with a saturable absorbing effect is applied onto the reflector, characterized in that the layer sequence (3) comprises a strained-layer single quantum well (6) and a cap layer (7), whereby the material composition of the single quantum well (6), its layer thickness and its strain in the layer structure within a wavelength range all serve to define an absorbing effect, this wavelength range includes the laser wavelength λ_L, and moreover, the degree of the saturable effect is defined by the selection of the distance between the strained single quantum well (6) and the boundary surface of the cap layer adjacent to a surrounding gaseous medium (10), wherein an absorption maximum for the laser wavelength λ_L is achieved by setting the lattice strain of the single quantum well and wherein said lattice strain lies in a range that is defined by the lattice mismatch between said single quantum well and the surrounding material of between 0.005 and 0.02 nm.

26. (Previously Presented) A saturable absorber for a laser wavelength λ_L, comprising a layer sequence (3) of several semiconductor layers with a saturable absorbing effect on a substrate (1) that is transparent for the laser wavelength, characterized in that the layer sequence (3) comprises a strained-layer single quantum well (6) and a cap layer (7), whereby the material